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C. L. HERRICK AS A MAKER OF SCIENTIFIC MEN.[1]

Ordinarily the closing of a life produces little impression. A limited circle of kinfolk and friends mourn deeply, and the impress of the departed one upon them remains for good or for ill as a character-moulding force. But the circle is small; those outside remember that death is appointed for all men and turn their thought from the unwelcome truth and the new illustration of it as quickly as possible. To be sure the death of a man prominent in public life touches many people, but ordinarily it does not touch them deeply.

A different case presents itself to us tonight; one has passed away whose ideals were so noble and so completely realized in his living, that a deep and abiding influence has passed into the lives of the large circle with which his work of teaching brought him into contact. With many of the earlier members of this Scientific Association these ties have been very close, and it is eminently fitting that we interrupt its ordinary activities tonight to linger for a little while in thought upon the life and services of its departed founder, Clarence Luther Herrick.

Others are to speak tonight of different phases of his personality and work; as a geologist, as a teacher, as a man, as a friend of Denison. I may not be able to avoid encroaching somewhat upon the territory indicated by these sweeping titles, and perhaps it is just as well that I should not. These aspects of his life are so important that it may not be amiss if we look at them from the different angles of several observers. But I desire to emphasize especially tonight his rare power of influencing young men—and that too without seeming to make any effort to do so—to adopt his own point of view on life and devote themselves, wholly or in part, to that quest of truth which was to him the great thing in life. This seems to me to be the most striking and

[1] An address given at a meeting of the Denison Scientific Association, Sept. 30, 1904, in memory of C. L. Herrick.

thoroughly characteristic thing in Professor Herrick's personality. He was learned, but we have known others learned too; he was devoted to his work, but such devotion though uncommon, we may find elsewhere; he was a rare teacher, but the country has many great teachers; he was a man of strong religious faith and rich Christian life, but that too we may parallel in other lives. But I cannot think of one other man who so powerfully impressed those with whom he came into any sort of contact with a real longing to find out new truth by their own effort and add it to the legacy of knowledge which the present generation has inherited from the past. His own work as an investigator was great; his work as a maker and trainer of investigators was perhaps greater. I have never known an enthusiasm so contagious as his. It is no mere accident that both of his brothers, his wife's brother, his only son and a large proportion of his students have caught the spirit of original research and made important contributions to the fund of new knowledge. Contact with him in classroom, laboratory or household seemed equally efficient for propagating the germ of personal investigation. He might have been a great teacher even without this power, as others have been; with it his success was assured, and eminence certain with favorable conditions.

As a fellow teacher whose work was more closely associated with his through some years than was that of any other member of the Denison faculty, this remarkable power of influencing young men was a matter of great interest to me and I tried to analyze it and find the reason for it, in the hope thereby of acquiring some small measure of such power for myself. I do not know that I can explain it satisfactorily, for any sort of personal magnetism seems almost beyond the power of analysis, but perhaps the attempt will enable us to gain a fuller understanding of his character and work, and incidentally help the considerable number among us who are, or expect to be teachers, to greater efficiency in our chosen work.

What then were some of the reasons for the unquestionable power he possessed of moulding the purposes and lives of his

associates? Let us note at least a few of them. One reason for this power was undoubtedly the perfect sincerity of his devotion to science. It was so apparent from even a slight acquaintance with him that he loved it and believed in it as a pursuit worthy not only of his own highest thought and most earnest effort, but deserving as well the supreme attention of any man. He was not given to proselyting; there was no direct appeal to others to interest themselves in those things which he pursued. But, given a noble mind, despising the shams which it already sees constitute so large a part of modern life, longing vaguely to realize its youthful dreams of mental achievement and moral victory, in close daily contact with an enthusiasm so pure and unselfish as that of Professor Herrick, is it any wonder that the ambition to emulate him should be kindled in that mind? We all know the teacher, who seems to teach for "what there is in it" for himself—such small return of money, social position or reputation as seems to be attached to his business; we have seen how he bolsters up his own dead interest in the progress of science by sounding phrases about the dignity of scientific pursuits. No one recognizes the sham more quickly or completely than the students in his class room, and with the recognition his power as a teacher is gone. No one can interest another in an intellectual problem in which he himself is not genuinely interested. Even if he believes himself interested, that is not enough; self-deception cannot save him. His students will feel —vaguely perhaps, but surely—that the interest is not real. On the other hand, the teacher with a genuine zeal for his subject, so simple that it never feels the need of self-assertion, already has his battle two-thirds won. The student unconsciously detects the real article as inevitably as the sham. As it is hopeless to deceive students by the parade of a simulated enthusiasm, so it is unnecessary to proclaim the existence of a real one. Thus Professor Herrick's intellectual honesty and genuine zeal for science found an answering note in the minds and hearts of all those whose lives touched his. We who knew him felt our own ambitions purified and enobled by the contact.

Secondly, his remarkable industry emphasized the effect of his sincere devotion to science. He was not one to tell you how much midnight oil he burned or in any way indicate the intensity of his labors, but both their quality and quantity compelled our attention and we watched and found that he rarely spent an idle minute. Not only were his working hours long, but intensely active. Many of us remember the long, quick stride which carried him so rapidly from task to task; it was an index of the energy of the mental machine within.

A letter recently received from a former student who was for a time a member of his household says: "The tireless energy of the man was inspiring. His light was the last to go out in the home, and on going to breakfast early in the morning it was no unusual thing to meet Professor Herrick returning from the woods or swamp with a supply of material for the day's classes. . . . . If he ever took a rest we never knew of it."

Some who loved him feared the results of this excessive activity and counseled moderation. But he seemed to be driven to work by some necessity of his very being which would not let him rest. Fortunately the long tramps and vigorous outdoor exercise, which his scientific labors demanded, gave some relief from the exhausting effects of the mental application to which he was so inclined, and enabled him to keep up year after year such labors as otherwise would have worn him out. Even those who disapproved of this overwork were forced to admire the unselfish zeal which caused it and felt a new impulse in their own pursuit of truth.

A third reason for Professor Herrick's ability to instill the spirit of research was found in his subordination of most of the common aims which move men to what was evidently the great aim of his life. Most of us attempt so many things that we do none of them very well. We divide our energies between money-getting, reputation-winning, recreation, self-culture and various public interests to such an extent that nothing in our individuality stands out to compel the interest of our fellows. But Professor Herrick, while remarkably faithful to all his duties

to others, managed to give such emphasis to his scientific labors that it became but natural to think of him always as a man-of-science.

Another thing that attracted students and led them unconsciously to seek to imitate him was the freshness and originality of his ideas. His mind was always taking conventional and commonplace ideas and making something fresh and new out of them. He thought much of the philosophical bearing of scientific things. "The Psychophysical Basis of Feelings," "Psychological Corollaries of Modern Neurological Discoveries" are two of many titles of his scientific papers indicating his tendency to philosophize upon the results of his scientific observations.

Besides the four mental traits which I have mentioned in attempting to account for the power he possessed of energizing others into scientific activity, there were moral attributes which contributed still more to the same end.

One of these was closely connected with his originality and mental independence, namely his courage in over-riding false traditions and calmly undertaking the solution of difficult problems. His was the pioneer type of mind. And so he frequently introduced novel methods in his teaching which aroused attention and interest. Although his connection with Denison was not a long one, he introduced at least four striking innovations which have already stood the test of years and bid fair to be permanent. These were (in chronological order) the Scientific Association, the Bulletin of the Scientific Laboratories, the Neurological Journal and the courses of study which lead to the degree of Bachelor of Science at Denison.

At the time of its introduction each one of these innovations seemed to be a questionable proposition, hardly likely to succeed. Professor Herrick had a larger faith than I. Yet so great was my respect for his opinion and my desire to help him in any plan upon which his heart seemed to be set, that I could not bring myself to express the doubts of success which I really felt. In three of these enterprises he very early sought my co-operation and so the question of practicability was forced upon my at-

tention in each case at the very outset. As I look back over the years, I have to confess that his judgment was better than mine. Note briefly how his larger faith has been vindicated.

He started the first volume of the Bulletin of the Scientific Laboratories the year following his coming to Denison. Whether looked at from the point of view of the probability of getting suitable financial support, of the small number and imperfect training of the students and other local workers who might be expected to furnish articles for it, or whether considered with reference to the likelihood of its receiving recognition abroad in the shape of exchanges with the really worthy scientific periodicals of this and foreign countries—viewed from any of these standpoints the enterprise seemed to many a hazardous one. But how has it turned out? The trustees of the University voted a sum of money to help publish the first volume and have continued to do the same year after year for now nearly twenty years. Sometimes when they did not see how they could do so, with the many pressing financial needs, some of their number have put their hands into their own pockets and extracted therefrom what was necessary to prevent any interruption or delay in the appearance of a publication, which they have come to recognize as of great value to the University. With regard to the question of finding contributors, examination of its index shows that twelve volumes have been issued, aggregating nearly 2,000 pages of valuable scientific material. In the first ten volumes (complete indices of the last two are not just now at my disposal), I find that there are 85 articles written by many different authors, most of them Denison men, students or faculty members, and not a few of them those who have become original workers mainly through the influence and example of Professor Herrick himself.

Undoubtedly its success has been mainly due to the fine start it made through the unremitting labors of Professor Herrick as editor. Of the 26 articles, which constitute the first four volumes issued under his editorship, no less than ten were from his own pen. And after ill health compelled him to seek another

climate, and in spite of the fact that he had taken the editorship of the Journal of Comparative Neurology upon his hands, we find him a frequent and valued contributor. So late as June, 1900, (in Vol. XI) we find an elaborate article of more than 60 pages with a map and 34 of the beautiful plates for which he was so well known.

As to his success in receiving recognition in the form of exchanges from the scientific institutions which issue publications made up principally of original contributions to science, witness the long rows of shelves in the library of the Association in Barney Science Hall, filled with several thousand valuable works from about 200 of the most famous learned societies of North and South America, Europe, Japan, and Australia. Through this means the name of Denison is known and honored in New York, Boston and Washington; in London, Edinburgh, Paris, Brussels, Berlin, Prague and Vienna; in Tokio, Sidney and Melbourne and most of the capitals of four continents.

In 1887 Professor Herrick founded the Denison Scientific Association, whose object, aim and history during seventeen years are well known to most of you. Very faithfully has it carried out its aims, as he expressed them in its constitution, "To collect, record and disseminate information bearing on the sciences, and to stimulate interest in local natural history and preserve specimens illustrating the same." I think very few of us who tried to help him start the Association expected that it would continue and develop as it has done. My own feeling concerning it is well expressed in a letter recently received from another of its charter members, Professor J. E. Woodland of the Rochester Athenaeum and Mechanics Institute. He says:

"I recall vividly the organization of the Denison Scientific Association and the enthusiasm with which Professor Herrick directed the work and gathered the material for the programs. I have been associated with other Scientific Associations since then but have yet to find the genuine local interest and enthusiasm that characterized the one in Granville."

During the three years which he spent on the Faculty of

the University of Cincinnati, he started the Journal of Comparative Neurology, and when he returned to Denison (in '92, I think) he had the courage to continue the publication of the new periodical, altho' the "Bulletin" was still being published. The success of the "Journal" has continued under the able leadership of his brother, Professor C. Judson Herrick, so that we have for a long time had the singular spectacle of one small college issuing regularly for a long series of years, two high class periodicals devoted to different fields of scientific investigation, each honored with a long list of valuable exchanges of its own class. I do not believe any American college of equal size can duplicate this record. And it is due principally to the courageous initiative and devoted labors of him whose memory we honor tonight.

The fourth innovation, due principally at least to Professor Herrick, was the complete revision of the work in science in the course of study leading to the B. S. degree at Denison. When he returned to Denison in 1892, after his three years' absence at the University of Cincinnati, he was relieved of the work in Geology and enabled to give all his time to Biology. He planned a number of new courses and advocated a complete revision of the last two years of the B. S. course. At this time the B. S. student at the beginning of his junior year had had two years' work distributed over four sciences (chemistry one year, mineralogy, physiology and botany, one term each) in addition to the elementary science required for admission to college. Before him lay 2 1/3 years' work required, 2/3 elective, distributed over five sciences (a year of physics, zoology, astronomy, one term each, and geology two terms, with the possibility of electing one term each of chemistry and histology). In a word he could not get more than one year of work in any one science during his whole college course (except in the case of chemistry where the maximum was four terms). Professor Herrick proposed to change this, so that each student at the begnning of his junior year should continue some one science through the remaining two years of his course, this science to be either biology, chem-

istry, geology or physics. (Civil engineering was later added to the list.)

Professor Herrick came to me with the general plan, and after we had worked it out in detail, it met the approval of the Faculty and was adopted. It has always seemed to me that this marked an educational epoch at Denison. It was a definite adoption of the Johns Hopkins plan of electing one fixed, logical course of study out of a considerable number of carefully planned courses, instead of the hap-hazard election of a lot of isolated terms work having no unity or logical sequence among themselves. It was another case where Professor Herrick's independence of tradition led to important results for Denison.

A sixth reason for Professor Herrick's ability to arouse the spirit of scientific research in others we find in the breadth of his interests and sympathies. He did not follow the fashion of extreme specialization so characteristic of our time. Before he came to Denison he was State Mammalist of Minnesota, at Granville he was botanist, zoologist, geologist and neurologist, not merely teaching but investigating along all these lines. While in New Mexico he added work as a mining engineer to that of geologist and neurologist, and in his last months we hear of his resuming study and writing along philosophical lines, a labor which had been begun many years before. And so under his tutelage we find one of his students inspired to be a botanist, another a biologist; several became geologists and others neurologists. And to all he was able to extend such counsel, stimulus and sympathy, that his infiuence became one of the determining forces in their lives.

And this brings us to the last reason that I will name to explain Professor Herrick's power over his students; namely, his personal interest in them, not alone in their scientific development, but in all their joys and troubles. Quoting again from Mr. Woodland's letter: "To the student he was never a professor with awe-inspiring dignity, but rather a companion and friend. . . . . There seemed to be some great pressure incessantly driving him to work, yet wth it all we never entered

his room that he did not make us feel entirely welcome. . . . His talks to the boys were full of interest and heart-sympathy —he never spoke a word of discouragement to anyone."

And now in conclusion let me illustrate several of these sources of Professor Herrick's power to inspire students by reading to you a letter which I received today from W. E. Castle, now Professor of Zoology in Harvard University, one of the many young men who honor Professor Herrick's memory in the highest possible way, by following in his footsteps.

"While in conversation with a Zoölogist from a distant state I was asked from what college I came. 'From a college,' I replied, 'of which very likely you never heard, Denison.' 'O yes,' was the prompt reply, 'I know of Denison; the Herricks have made Denison famous.' This incident gives evidence of the high regard in which the scientific work begun at Denison by Professor C. L. Herrick, is held among workers elsewhere in similar lines.

In the opinions and affections of his pupils Professor Herrick occupied a still larger place. His coming to Denison marked an epoch in the intellectual life of many who were then undergraduates. It was to them what the Reformation was to Europe. It marked the termination of authority, the beginning of intellectual liberty. Through all their previous studies they had dealt with facts carefully marshalled, concerning which two opinions could not exist. Knowledge was something to be mastered and used. It was given to them on authority, which they had neither occasion nor disposition to question.

Now came a man who quietly brushed aside authority and invited them to create knowledge. The idea was so novel and preposterous that they looked at each other, half-puzzled, half-amused, wondering whether there really could be profit in studies so undeveloped that they offered anything but unquestioned verities to the beginner. This was venturing on an uncharted sea; is it any wonder that like the sailors of Columbus we hesitated?

Not only were the methods of our new teacher unusual, his

subject matter too was un-school-like. Birds, flowers, and pebbles had been our playthings and companions in the fields from childhood, but in the school-room never. Any boy caught with them on his person was in disgrace. Our new master threw open the door and invited us to come out and know these same playmates of our childhood better, and to know them not as someone else had seen them, not as he saw them, but just as they came from God's hand. We went and we looked, and little though we saw, some of us were so entranced with the seeing that we are looking still. Others more mindful of duties elsewhere, have gone to the school-room or the home, but I venture not one has forgotten what he learned from Professor Herrick, to see for himself and think for himself and to love and try to understand God's world."

A. D. Cole.

CLARENCE LUTHER HERRICK.

We are called upon with the present issue of the *Bulletin* to lament the sad and untimely death of its founder and editor-in-chief at Socorro, New Mexico, on the 15th of September. For the past ten years, dating from his last connection with Denison University, he has struggled heroically against tuberculosis of the lungs, together with other complications, which at last cut him off in the midst of his labors and in the prime of life. Untimely as his death must seem when regarded from the point of view of his plans and hopes, yet Dr. Herrick had done an amount of scientific research and philosophical writing, some of which he was preparing for the press when he was taken, which assures him an enduring name in the world of thought.

The end came in accordance with his own most earnest wish —he fell fighting for the truth. As one of those who were near him when he passed away has said: "He was taken literally in the harness. His laboratory and study tables showed the unfinished tasks. His morning mail brought its usual load of duties. He had contributed an article to the September number of the *American Geologist,* and his mail, on the morning of his death, brought a request from Dr. N. H. Winchell for some further contributions to the October number. Thus in the midst of his labors he passed into the larger sphere."

Very early in his career he seems to have laid out, at least in a general way, a plan of action, including for the first part of his life miscellaneous research and study under direction in the broad field of general natural history. Upon the basis of this foundation, was to follow a period of intense specialization in a circumscribed field of zoological work leading up to a mastery

of the anatomy and physiology of the nervous system. Finally the ripest years were to be devoted to physiological and comparative psychology on the basis of the mechanics of the nervous system and to philosophical correlation.

His life may be roughly divided into four periods. While these were marked by extraneous events and were apparently purely artificial and arbitrary, yet it may be said that the ideal scheme was in the end fairly achieved, though with great deviation in the details of the working.

Dr. Herrick was born near Minneapolis, June 21, 1858. He grew up in a home far from neighbors, a solitary child with few playmates, and very early showed his bent as a naturalist. While still in the Minneapolis High School he collected extensively and left at graduation a case of over a hundred mounted bird skins and other specimens to the high school. It was during this period that his father, despite his poverty, got him an eight dollar microscope. With this crude instrument and without guidance or library facilities he worked over the fresh water fauna of the neighboring brooks and pools so thoroughly that before graduation from the University of Minnesota in 1880 he had published several articles of value on the fresh water crustacea of Minnesota and four years after graduation, with somewhat better facilities, published a report on the micro-crustacea of Minnesota, which is still standard. The materials for this report were elaborated before he graduated from college.

These years were filled with many bitter struggles, not the least of which was with poverty and the consequent lack of material for study. But, notwithstanding, he completed the college course in three years, at the same time partly supporting himself by assisting on the staff of the Geological and Natural History Survey of Minnesota. He had also showed so obvious a native gift with his pencil that upon his graduation the president of the university said to his father that he was uncertain whether to advise the young man to devote his life to science or to art. But there was no uncertainty in the mind of the graduate. Continuing his work on the Geological and Natural His-

tory Survey of Minnesota, he published many papers in rapid succession on the fauna of the state and began an extensive report, the first volume of which was completed in 1885. This was a large quarto on the Mammals of Minnesota, fully illustrated with many colored plates and pen drawings. It was accepted for publication, but for lack of funds in the Survey never saw the light. Years afterwards, in 1892, a small octavo was published by the Survey made up of the more popular parts of this work. The remainder is still preserved among his literary effects. The season of 1881-2 was spent at the University of Leipzig, and in 1883 he was married to Miss Alice Keith of Minneapolis. This, roughly, may be said to constitute the first period of his life, from 1858 to 1884.

He was called to the chair of Geology and Natural History of Denison University in the summer of 1884. He spent the fall of that year at Denison, then returned to Minneapolis to complete the work in progress in the Minnesota Survey, and in the fall of 1885 moved with his family to Granville. Meanwhile, in 1885, he took the degree of M. S. from his *alma mater*. It had been his intention to continue his zoological work, and there was great activity in this line during the entire period, but the routine excursions made in the course of the instruction of his geology classes showed him so much of interest in the local strata that his chief labors while in Granville were upon the fossils and stratigraphy of the Waverly free stones and shales of Ohio. This work was abruptly cut short by his removal from Granville in 1889 and, while never rounded out as he would have liked, is probably his most important geological work. In 1885 he founded the Bulletin of the Scientific Laboratories of Denison University, in which the greater part of his researches, and those of his pupils, on Ohio geology were published.

His phenomenal success as a teacher during this and the subsequent periods was due to factors, some of which are easily seen—others are harder to define. After his attractive personal qualities and magnetic enthusiasm, I should place his deep philosophic insight and the fearless way in which he disclosed his

profoundest thinking to the least initiated of his pupils. The ability to do this without befogging the air was an exceedingly rare gift and was stimulating even to a dullard. He knew the philosophical classics thoroughly from original sources and the trend of his thinking was very early foreshadowed in the translation of Lotze's Outlines of Psychology published in 1885 in Minneapolis, with his own appended chapter on the structure of the nervous system.

Upon his removal to the University of Cincinnati in 1889, with which the third period of his life may be said to begin, the geological studies with which the preceding five years had been so fully occupied were summarily brought to a close and he threw himself with renewed energy into the study of the nervous system. Extensive papers on the brains of different animals appeared in rapid succession, of which the most valuable are two series, one on the brains of various fishes, the other on those of reptiles. In 1891 the *Journal of Comparative Neurology* was founded and served as the medium of publication for most of these researches. The founding of this Journal can best be designated as a piece of characteristic audacity. It was a purely private enterprise, with no fund to defray the expenses and very little outside coöperation promised. But without counting the cost he plunged boldly in, expecting a constituency to be developed as the work went on. In this he has not been disappointed, though recognition of financial needs has lagged sadly behind that of the scientific value of the Journal.

At the close of 1891 he resigned his chair in the University of Cincinnati to accept a chair of biology in the University of Chicago, then being reorganized. The early part of 1892 was spent in Europe, chiefly Berlin. Upon his return the adjustment at the University of Chicago presented unexpected difficulties and after a series of misunderstandings he finally withdrew from that institution, declining an offer to return to Germany for further study on full salary. He was immediately elected to his old post in Denison University with an assistant and the privilege of devoting only a part of his time to teaching, the re-

mainder, either at home or abroad, to the further prosecution of his research. A year and a half of great productiveness followed. He bought a small tract of land adjacent to the college campus, built a residence upon it and planned to devote the remainder of his days to breeding animals on an extensive scale and studying the laws of heredity, comparative psychology and allied problems. But before this project was fully under way his health broke down completely and he was forced to abandon his home in the fight for life.

In December, 1893, he had a severe attack of la grippe, but, as was his custom in illness, went on with his work as usual. Upon completion of the last examination of the term he came home too ill to correct the papers, and in course of the following night was atacked by a severe hemorrhage from the lungs and for weeks his life hung in the balance. With the return of spring his strength increased sufficiently to enable him to remove to New Mexico, where the local physicians told him that he had a fighting chance for a few years. He accepted the challenge bravely and for more than ten years held the disease in check. During the spring of 1894 his college dedicated the Barney Science Hall, which had been built largely under the stimulus of his presence in the faculty; but he was never permitted to work in it.

The fourth period, from 1894 to 1904, covers the remaining years of his life.

This decade, filled with bodily pain and the worse torture of anxiety and mental unrest, is yet one of the most productive periods of his life. Much of the time was spent in the open with covered wagon and camp kit, and with the return of strength scientific interests again absorbed his attention. Naturally in this case he again turned to geology and an extensive series of articles on the geology of New Mexico bears testimony to the industry of these apparently aimless wanderings. The first scientific work done in the Territory, however, was a revision of his earliest important work, the Crustacea of Minnesota. As soon as his geological knowledge became known his services were in

demand as a mining expert and during the later years of his life in the Territory he supported himself and his family chiefly by practicing this profession as strength permited. In 1898 he took the degree of Ph. D. from the University of Minnesota. . For four years (1897-1901) he was president of the territorial university at Albuquerque, though at the close of the third year it became evident that the strain of the executive work and confinement were too hard for him, and the connection during the fourth year was mainly one of supervision and general control.

During his last year there was an obvious failing of physical strength, so that long field trips had to be abandoned. But the more quiet life gave opportunity for a thorough recasting of many questions and formulation of matters which had been in his mind all his life. So that before his death much of the philosophical correlation, of which mention has been made, was effected. A number of articles have already been published in the philosophical serials bearing on these matters and there is a considerable collection of MSS. remaining, much of which can doubtless be edited for publication. It is gratifying to know that he had the satisfaction of seeing this work so well rounded out before his death and that the latest months of his life were much more restful than those preceding, some of which were marked by extreme suffering. He continued in about the usual health until September 8, when he again had a series of uncontrollable hemorrhages, daily becoming weaker until on the morning of the 15th he peacefully passed away.

One essential feature of his success must receive mention here—the devoted heroism of his wife. His work was always stimulated by her interest and coöperation; but during the last decade his life was unquestionably preserved by her self-sacrificing care. She often accompanied him for weeks on wagon trips far from settlements in order to see that he had proper food and comforts, sometimes enduring severe hardships and sacrificing her own health for his welfare. He is survived by his wife and two daughters, Laura and Mabel, and his son, Harry N. Herrick, now a student in the School of Mines of

the University of California.[1] It remains here to say something of Dr. Herrick first, as an investigator and thinker, and secondly, as a teacher and as a man.

In estimating the character of his work it is difficult to say whether he was primarily an investigator or a philosopher. And this is to his great credit for he combined in a remarkable degree the qualifications of an expert in both of these lines. He had at once acute perceptions, and keen insight for scientific details, and a broad philosophic horizon and perspective which peculiarly fitted him for the work he undertook of throwing light upon the nature of consciousness from the neurological side. A glance at the appended bibliography will show that a philosophic scope as well as a scientific specialization characterized all his work.

His work in every line was exteremely suggestive, and it should be added, seldom exhaustive, though certain of his neurological and geological papers reveal his power of accurate and detailed research. But his thought ever was moving forward, and he was impatient of the routine details which would put any check upon his richly developing insight.

His scientific labors fall in three states—Minnesota, Ohio, and New Mexico. Of his work in geology during the first and second periods of his life we have already spoken. His neurological work was done mostly during the second and third periods, while connected with the University of Cincinnati and with Denison University.

The first contribution in neurology was the elementary chapter on the nervous system appended to the translation of LOTZE'S Outlines of Psychology, published in Minneapolis, in 1885. This is significant not so much for its content (though here the dynamic point of view is dominant) as for its context. The juxtaposition, in a manual designed for an elementary text-book, of LOTZE'S lectures and original lectures on the mechanism of the brain was a decided novelty in those days.

[1] He took his mining degree in 1907 and now holds a post in the same university.

In 1889 he began work in earnest on the nervous system and immediately there appeared a series of papers in rapid succession, some of great length and others mere jottings. The first long paper was published with Professor W. G. Tight in the Denison University Bulletin in 1890 and was entitled "The Central Nervous System of Rodents." This paper contains nineteen double plates and a vast amount of observation; and was designed as a preliminary survey of the field, the plates to form the basis of further detailed observations and correlation. But he soon became convinced that this correlation could best be attempted after a thorough study of several types of lower brains and the series was interrupted. At the time of his breakdown in 1894 he was just about to take up again by the degeneration methods a more thorough study of the mammalian brain. Thus this rodent paper stands now as an unfinished fragment.

This, however, illustrates well his plan of work, a plan which must be clearly understood in order to put a proper estimate on his published researches. He found correlation impossible and at once saw that only in primitive types could the key be found, and that too not in any one series, but only in the common features of many lower types. Accordingly he undertook to examine in rapid succession as material offered a large number of lower brains, taking voluminous notes and publishing the *observed* data as fast as they were ready. All of this work was fragmentary and much of it contained but little correlation. But the mass of facts gathered and recorded was enormous. He realized that the incessant strain on his eyes could not always be kept up, and planned to accumulate fact as rapidly as possible until failing eyes should impair his efficiency in this field. *Then* he hoped to review the whole field of vertebrate neurology systematically, using his own observations as the skeleton on which to build by study of literature and further research of his own on critical points, until the whole should take shape as a unity. When he settled in Granville the second time in 1893 he expected to begin that work of correlation, and this is doubtless the special significance of the announcement published at that time of a

text-book on comparative neurology. But this period of work he was not able to enter far and the text-book is still unpublished. This manuscript, together with that of several other projected works on psychology and ethics, remains. It is yet too early to state how much of this matter can be edited for publication. If the last ten years of his life could have been spent in Granville, as was his plan, results of moment in the way of correlation would undoubtedly have followed. As it is, none of the papers in neurological lines were regarded by him as other than fragments.

The first important paper in neurology was published in the *Journal of the Cincinnati Society of Natural History*—"Notes upon the Brain of the Alligator." This is an elaborate descriptive article illustrated with nearly a hundred of the beautiful pen drawings which he used so freely in all of his work.

The second neurological paper of special importance was the leading article in the first issue of the *Journal of Comparative Neurology,* on the histogenesis of the cerebellum in correlation with its comparative anatomy. This paper was ignored largely by the workers immediately following, but its main points have been fully confirmed by later students. It is really, though very brief, one of his best contributions.

Of the remaining neurological papers, the most important were published in the *Journal of Comparative Neurology,* those in the *Anatomischer Anzeiger, American Naturalist,* etc., being for the most part summaries of the longer articles. These were descriptive articles in most cases, devoted mainly to the brain of fishes and reptiles, with some attention to amphibians.

The greater part of his descriptions of the fish brain have since been worked over with the same sections which he used in hand, and his descriptions have been found to be very exact, though often so brief as to make it difficult to understand them without reference to the preparations. Furthermore they stand the test of control by the more recent neurological methods very well, though of course not always in detail. His method of pushing a given research through rapidly enabled him to cover a great

deal of ground with surprising fidelity to the facts of his material. But the method results in a positive hardship to his readers, since the matter was not fully digested and correlated before publication. While, therefore, this matter is of great value, it is hard to read and will not be used fully save by a few specialists until it is worked over and correlated within itself and with other more recent work. It is hoped that this may be done soon. The facts as stated must necessarily serve as the basis for any future work on the types which he studied.

After his departure for New Mexico a few brief neurological articles were published, but only fragments remaining from his earlier work or critical articles. This period was devoted chiefly to geology and other studies which could be pursued out-of-doors, and more recently to philosophical writing.

In 1892 he contributed a short paper to the Leuckart Festschrift. In 1893 he wrote four articles for the supplement to Wood's Reference Handbook of the Medical Sciences. He also wrote a few articles for the second edition of the Handbook, beginning in 1900. In conjunction with C. Judson Herrick, he prepared the neurological articles for the Baldwin Dictionary of Philosophy and Psychology, some of these being encyclopedic articles of considerable length.

The best years of his life were devoted to his neurological work and it is all of a high order of merit, yet one feels that in very little of it did he do himself justice. His impetuous temperament and phenomenal ability to turn off research rapidly is partly responsible for this; but its unsatisfactory character is largely due to the fact that it was cut off prematurely. He never had the patience to polish his work as some like to see it done, and it would have been much more accessible if he had put even the unfinished reports of progress into more systematic form. Yet, even as it is, the aggregate is a monumental work to stand as the out-put of only about half a decade of productive work.

Of his work in New Mexico one who had first-hand knowledge writes as follows:

"He first resided, with his family, in Albuquerque, and while

gaining strength, began to study the local fauna and flora. Perhaps it may be allowable to give an incident from this period of his life, for it is most typical of him.

"While recovering strength he was accustomed to lie upon a couch in the open air. His microscope was close at hand, and he began at once the study of our fresh water crustaceans. For a few minutes he would study his creature under the microscope, make his exquisite drawings, write out his description, when, being seized with a coughing spell, he would be forced to his couch completely exhausted, to remain there perhaps half an hour before he could resume his study.

"This incident illustrates two characteristics. It illustrates first, his unremitting labors. Only when necessity compelled did he cease his labor. True, he had his recreations, but these were often of such character as to be downright labor for most men. The incident also illustrates, secondly, his deep thirst for knowledge. Only he who has drunk at the fountain of inspiration could labor so incessantly under conditions so unfavorable.

"After some months spent in Albuquerque, Professor Herrick and his family moved to Socorro. There he became interested in geological studies, and also collected a considerable herbarium of native plants. He contributed occasional articles to the *Journal of Comparative Neurology*. In the spring of 1897 he, in company with his son Harry and Dr. Maltby, made an exploring trip to the Tres Marias Islands, off the western coast of Mexico, where a large natural history collection was made.

"Upon his return from Mexico, Professor Herrick was elected President of the University of New Mexico, and began his new labors in 1897. His wide experience, having been connected with three universities, viz., Minnesota, Cincinnati and Denison, his several trips to Germany, where he met and worked with the leaders in the biological sciences, his national reputation in fields of zoology, geology, neurology, psychology and philosophy, gave him an ideal preparation as a college president. No wonder, then, that he drew to him immediately a number of advanced students who were inspired by his genius and broad

knowledge, and who fairly worshiped him.

"In passing, it may be mentioned that under him the policy of the University was completely reversed. From a literary academy, it became a scientific school; from a preparatory school it developed into a college with a post-graduate department. In three short years the institution was placed where it belonged —at the head of the school system of New Mexico.

"Upon entering his new duties, Dr. Herrick commenced the biological and geological survey of the territory.

"Two volumes of original investigations in these lines speak for themselves. In addition, contributions were made to some of the leading journals of America, especially to the *Journal of Comparative Neurology*, the *American Geologist* and the *Psychological Review*."

Of Professor Herrick's contributions to philosophy a word should be said. That his interest was a deep and abiding one is abundantly evident from a glance at his writings which include many articles and discussions dating from the publication in 1882 of his translation of Lotze's lectures on psychology to the series of articles on "Dynamic Realism" which he had begun to publish in the *Journal of Philosophy, Psychology, and Scientific Methods*, at the time of his death. He made frequent short contributions to the *Psychological Review*, besides publishing various articles of a psychological and philosophical character in the columns of his own *Journal*. His interest in problems of ethics and religion is evidenced by divers articles in certain of the religious periodicals as well as by much unpublished MS.

Of his metaphysical writings it should be said that they were always inspired by his scientific researches. He never was satisfied with the easy philosophy of the "anti-metaphysical" standpoint of many fellow scientists. Psycho-physical parallelism he regarded as "the Great Bad." The aim of his life was to throw light upon just such so-called insoluble problems as the relation of consciousness to the brain. "Ignorabimus" is a word which never fell from his lips. The unity of the material and the mental is a truth upon which he came to lay increasing stress in his later

years. Starting from a Lotzean spiritualistic idealism he never lost hold of the monism which characterizes that philosophic world-view, though in many respects he worked beyond it, his scientific studies serving to correct any tendency to an exclusive emphasis upon the mental. This is seen in the title under which his latest writings appear—"Dynamic realism"—in which many will find hints of a coming philosophic movement which is to reinterpret the fixed ontological categories of a past metaphysics in more dynamic and organic terms.

Of his contributions to the theory as to the nature of consciousness (equilibrium theory of consciousness), the physiological basis of the emotions, theory of pleasure-pain (summation-irradiation theory of pleasure-pain), his discussion of the reflex arc or organic circuit under the terms of his own coining ("aesthesodic" and "kinesodic"), and in general his interpretation of experience in dynamic and energic terms, we may not here speak in detail. But the attention of the readers of this *Bulletin* should be called to this side of his work as it is embodied in his various published writings and especially in certain writings which are yet to appear.

In the memory of his pupils Professor Herrick was greatest as a teacher. This statement can only be appreciated by those who knew him personally and were in his classes. There was no display or oratory. He was not what would be called a gifted public speaker, though he was often called upon for such services. It was in the class-room or about the seminar table or in general conversation that the inexhaustible fertility of his thought and fine suggestiveness of his language appeared. In his lectures one always knew that he was geting the best, the latest, the deepest results of his scientific research and philosophic reflection. Never was any work slighted in which his students were involved. Other things might be sacrificed—time, money, convenience, even health itself, but never the student. The result was that his teaching was not confined to the class-room or laboratory. There never was an occasion upon which he was not ready to suggest, advise, assist the groping mind in its search for the truth.

He was extraordinarily versatile in the class-room. He would lecture with a piece of chalk in each hand, sketching at the same time ambidextrously upon the blackboard the figure he was describing. Never did the lecture degenerate into a mere description of the figure. The figure he was describing was the figure in his mind, the figure that he was thereby suggesting in the student's mind. Such description and all the other instrumentalities of the class-room and laboratory were always kept in their proper place and proportion as means to the end of knowledge and insight. His artistic sense was too fine to allow them ever to degenerate into mere ends in themselves; the technique of his teaching was in itself a work of art, the more that it was unconscious on his part. His courses in neurology, embryology, and histology were primarily courses in thinking. This is no doubt the reason why so many of his students look back upon his teaching as the period of their intellectual awakening.

One of his colleagues at Denison University says of him: "All who knew Professor Herrick loved him. Different friends had different reasons for loving him, but all agreed in loving. Christian people loved him because he was a loyal Christian man. Intellectual people loved and admired him because of his brilliant and keen intellect; and men in general loved him because they saw in him a true and noble man loving the truth and living it out in his daily life."

As has been said of another: "He did his work with a quietness which concealed its power. He contributed to science our best example of the scientific temper. He was a profound thinker. He was a successful teacher. He was a lover, inspirer, and leader of youth."

H. Heath Bawden.

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